AN EVALUATION OF COMPUTER BASED CONTINUING MEDICAL EDUCATION FOR BOCA RATON FIRE RESCUE SERVICES

EXECUTIVE LEADERSHIP

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ABSTRACT

Continuing education can be defined as a lifelong learning process, which builds on and modifies previously acquired knowledge, skills and attitudes of the individual. Fire Fighters and Paramedics must continually review and acquire new knowledge necessary to maintain skills that assist them in providing emergency services. The challenge for Boca Raton Fire Rescue Services was to continue with their quality emergency medical training while also meeting the requirements for re-certification. This needed to be achieved while also meeting the state and federal mandates in areas such as fire suppression, hazardous materials, and technical rescue. Historically, standard classroom based training had been utilized to meet all of our training needs. The problem was Boca Raton Fire Rescue managers realized it wasn't possible to fit the required 323 hours of required training for all of these programs into the traditional classroom format.

In order to meet the state and federal training requirements, alternative methods needed to be utilized to make the best use of on-duty time. This research focused on the re-structuring of continuing medical education. This project employed historical and evaluative research methods to answer the following questions:

1. Is there a more efficient means of providing Continuing Medical Education than the traditional classroom method?
2. What previous training methods for continuing medical education have been utilized by Boca Raton Fire Rescue Services?
3. Will computer based continuing medical education be accepted by Boca Raton Fire Rescue Services personnel?

The procedure used was a literature review, and a survey of 65 members of Boca Raton Fire Rescue Services that had recently completed an on-line training course. The research showed that the majority of the respondents felt the computer based blood-borne pathogens class, provided an effective method for learning the required information. Recommendations were made to implement additional computer based training.

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INTRODUCTION

Continuing education can be defined as a lifelong learning process, which builds on and modifies previously acquired knowledge, skills and attitudes of the individual. Fire Fighters and Paramedics must continually review and acquire new knowledge necessary to maintain skills that assist them in providing emergency medical services. Boca Raton Fire Rescue Services has historically prided itself on its quality emergency medical services. Maintaining this high standard is partially achieved through quality in service training.

The current challenge for Boca Raton Fire Rescue Services is to continue with their quality emergency medical training while also meeting the requirements for recertification. This must be achieved while also meeting the state and federal mandates in areas such as fire suppression, hazardous materials, and technical rescue. Historically, standard classroom based training has been utilized to meet all of our training needs. The problem is Boca Raton Fire Rescue managers realize it isn't possible to fit the required 323 hours of training for all of these programs into the traditional classroom format. As a consequence, the training Chief must find alternative methods for continuing medical education and better utilization of time, rather than having units driving back and forth to a main training classroom.

The purpose of this research is to determine whether computer based continuing medical education (CME'S) will be an acceptable method for Boca Raton Fire Rescue Services.

This study uses historical and evaluative research methodology and seeks to answer the following questions:

1. Is there a more efficient method of providing Continuing Medical Education than the traditional classroom format?

2. What previous training methods for continuing medical education have been utilized by Boca Raton Fire Rescue Services?
3. Will computer based continuing medical education be accepted by Boca Raton Fire Rescue Services personnel?

BACKGROUND AND SIGNIFICANCE

The City of Boca Raton is a municipality located in southeastern Palm Beach County, approximately forty miles north of Miami and midway between the cities of Fort Lauderdale and West Palm Beach, Florida. Boca Raton is a 28 square mile residential and business community of 85,000 people.

Boca Raton Fire Rescue Services Department comprises five 24 hour transport- capable paramedic rescue units, one 12 hour peak time paramedic rescue unit, and six advanced life support-capable fire apparatus. Boca Raton Fire Rescue Services is the sole provider of emergency medical services for the community which started advanced life support paramedic services in 1974. Boca Raton Fire Rescue Services employs 182 state certified fire fighters, of which 152 are state certified paramedics and 30 are state certified Emergency Medical Technicians. Operations personnel work 24-hour shifts with 72-hours off in between. This means that operations personnel work eight shifts per month six months of the year, and seven shifts per month the other six months of the year, totalling 88 shifts per year.

In 1972 the department employed 51 full-time fire fighters and one training officer. The training officer was assigned to a 40-hour work week and completed all of the required training by himself either through hands-on training or a new training tool, video. This method of training continued into the early eighties until a new way of training was implemented. A local vocational school, South Tech., was hired to provide hands-on training in various fire ground

activities and medical education for the low price of 63 cents per hour, per student. The fire fighters enjoyed the hands-on training that allowed them to work on their skills. Because of the vocational college employees providing the training, the department only had to maintain one training officer who's main responsibility was scheduling class times and subjects. Unfortunately, in 2001 the vocational college closed leaving one training officer to provide training to approximately 150 firefighters. Assistant Chief John Eddinger states, "Since we were buying our training at a ridiculously low price, we never had to expand our training division. It's been three years since South Tech. closed and the department still has not recovered with appropriately staffing our training division" (personal communication, October 29, 2004).

Not only is the training division under staffed, but the current method of providing training has logistical issues. For a standard two-hour class, the training is done in four sessions each day. Each day is repeated for a total of four days. Typically one engine, one rescue, and a special apparatus are sent to the classroom at Fire Station 5, located next to the Fire Administration Building. Moving of apparatus wastes precious time during the day, and if units are sent on an emergency call prior to their scheduled time, training can be delayed up to an hour. This rotation is used to keep the City covered by an adequate number of emergency response units. This format has been in place since 1973 when the department ran 386 calls. In 2003, Boca Raton Fire Rescue Services responded to over 14,000 calls.

In order to maintain their certifications, today's fire fighters must meet the requirements of many organizations. These include the National Fire Protection Association (NFPA), State of Florida Fire Fighter mandates, the State of Florida Bureau of Emergency Medical Services, the Insurance Service Organization (ISO), and the Center for Disease Control (CDC). Each of these organizations govern how much, and what type of training fire fighters and Paramedics must

receive each year to maintain their certifications. In total, the minimum requirements each year for fire fighters equals 301 hours.

Additionally, those fire fighters who are cross-trained as Paramedics must have additional continuing medical education units every two years. These include blood-borne pathogens training, Basic Life Support CPR, and Advanced Cardiac Life Support every two years. This adds an additional 22 hours of medical continuing education to an already full fire fighter training schedule each year.

To implement all of this required training, classes would have to be held in four hour increments. Fire Fighters would have to train every day they are on duty including weekends and holidays.

In order to meet the state and federal training requirements, alternative methods need to be utilized to make the best use of on-duty time. This research focuses on the re-structuring of continuing medical education.

This research project is significant to Boca Raton Fire Rescue Services for several reasons. The research:

- Examines the efficiency of the current method for providing medical continuing education.
- Analyzes the previous training methods for medical continuing education that have been utilized by Boca Raton Fire Rescue Services?
- Determines if computer based training will be accepted by Boca Raton Fire Rescue Services personnel?

In summary, the research is meaningful to Boca Raton Fire Rescue Services because it is vital that alternative methods for continuing education be utilized. By identifying available

methods to achieve its goal, managers can determine which method will best suit the needs of the department. By soliciting input from the personnel that will use the training, managers can also evaluate which method will be best accepted and thus utilized in an efficient manner.

The National Fire Academy Executive Leadership course requires that each student complete an applied research project within six months of completing the classroom instruction.

In the course E*xecutive Leadership* **,** influence is described as "being so persuasive that the other person finally wants the same thing you want" (National Fire Academy [NFA], 2000). By using the influence style "Participation and Trust", you let individuals know that you value their input and contribution. By working with others and discussing the situation at hand, in the end they will want what you want. By discussing the problems associated with the current training schedule, and reviewing the options available, in the end the members of Boca Raton Fire Rescue Services will agree that changes need to be made and will accept the new training methods. This research is relevant to *Executive Leadership* because it identifies influence styles as a strategy to sway a person's point of view so that they will want what you want. Influence is a subtle way of getting one's way and having people accept the decisions that are made.

This research is related to the Unites States Fire Administration's operational objective, "To appropriately respond in a timely manner to emergent issues" (NFA, 2002, II-2). By changing the current method of training to a more efficient medium, Boca Raton Fire Rescue Services can better schedule the necessary training to meet all mandates.

LITERATURE REVIEW

There are several reasons why Paramedics need continuing education. The first reason is that the State of Florida requires it. All Paramedics must recertify every two years. During that two year period, Paramedics must receive training in Advanced Cardiac Life Support (8 hours),

Basic Life Support CPR Renewal (4 hours), HIV/AIDS (2 hours), and an additional thirty hours of recertification training. The State does not specify the method of training, only that it be provided by a certified training center. Another reason Paramedics need continuing education is due to the rapid advancements made in medicine every year. Dan Ozimek (1994) who teaches new EMT's and Paramedics states, "The average EMT or Paramedic now performs skills and has a knowledge base my classmates and I never dreamed of obtaining" (p. 23). He goes on to state, "Veteran EMS personnel have to acquire these new skills, which rookies are now learning in the classroom, through continuing education" (p. 23). Not only do you learn new skills in continuing education classes, but you also refresh skills you learned many years ago. Jason White, training coordinator for the Missouri Bureau of EMS states, "Almost every skill acquired by basic EMS personnel needs retraining" (Pollock, 1992, p. 47).

There have been multiple studies on the decline of skills and knowledge that medical professionals experience over time. In one study, Moser and Coleman (1992) found that cardiopulmonary resuscitation (CPR) skills can decline as fast as two weeks after course completion**.** Zautcke, Lee, and Ethington, (1987) state, "Skills requiring the most sophistcated psychomotor abilities deteriorated the fastest" (p. 505).

Since the late 1800's medical professionals have received education in the forms of lecture and professional journals to increase or maintain their knowledge base. According to Moshinskie (1997) the official term of "continuing education" did not emerge until the 1960's (p. 27). Traditionally Paramedics have received their continuing education in lecture format. Some organizations administered their own training while others require the individual to find a teaching institution in the area. Whether taking a class through work or through a particular

teaching institution, one of the problems associated with continuing education is finding quality instruction. Heller, Stoy, Shuman, Wolfe, and Zavada (1994) state,

> Sometimes, EMS personnel who do locate accessible continuing education find that the instruction is unacceptable. These complain about poor instructional designs that result in the same old, same old-just rehashed by the same instructors. The students often report that the continuing education is passive and does not challenge them with new ideas or concepts that will help them improve field care. In these situations, the students feel unmotivated to take the continuing education (p. 26).

Logistically speaking, the classroom lecture format causes multiple problems when assemblying on-duty personnel. Units must be sent from various areas throughout the City to a single site. If multiple alarms are received, units get interupted and have to respond to calls. This causes a disruption in the learning process and wastes valuable time in a responders already full day. Heller et. al. (1994) states,

> The very nature of the traditional classroom setting is inefficient and at time an infeasible format for use in the presentation of EMS continuing education. In many systems it is not possible to assemple a critical mass of Paramedics within a single venue to allow for the efficient promulgation of education with on-site instructors (p. 40).

Another drawback to the traditional lecture format is positively knowing that every student is participating and acquiring the necessary information. Day and Pane (1987) state, "One of the major disadvantages of the lecture method is its lack of control over ensuring that all students are paying attention to and learning the material being presented" (p. 31). In every

class, you see one portion of the students listening attentively and participating, while another portion is either not engaded or half asleep. Much of this depends on the individual instructor and their ability to interact with the students through questions and answers. While everyone agrees continuing education and retraining is vital, the method in which it is delivered is still open for much discussion. When teaching adults, instructors need to be aware that there are many different learning styles when preparing new material. Understanding the different learning styles will help instructors prepare materials that will benefit adult learners the most. According to theories by Cantor and Cranton (1992), Adult learners are, autonomous and self-directed, goal oriented, problem centered, problem solvers, and use life experience during their learning process. In a report on learning styles Kearsley states, "Instruction for adults needs to focus more on the process and less on the content being taught. Strategies such as case studies, role playing, simulations, and self-evaluations are most useful" (Blackmore, 1996, p. 2). According to Dewar and Hartman, students who are actively engaged in the learning process will be more likely to achieve success (Blackmore, p. 1). They go on to state,

Once students are actively engaged in their own learning process they begin to feel empowered and their personal achievement and self-direction levels rise" (Blackmore, p.1).

In order to make sure adult learners are benefiting from training sessions, an evaluation system should be utilized. In the *Journal of Industrial Teacher Education*, its authors, Boyle and Crosby (1997) discuss the evaluation system developed by Donald Kirkpatrick. Kirkpatrick measures a program's effectiveness using four sources.

1) The feelings the student has about the program-reaction.

2) The degree that the student learned the material-learning.

3) Their ability to transfer the training to the work site-application and

4) The impact of the training on the organization-results.

Boyle and Crosby go on to state,

> Kirkpatrick's four-level evaluation system has become a standard for business and industry because it provides comprehensive data to support training programs. If adapted for use in academic programs, this system will provide data to ensure that our students 1) like the program, 2) are learning the material, 3) are able to apply the material in work settings, and 4) have the correct competencies to compete in the job market (pgs. 83-84).

While facilitating learning is the ultimate goal, creating an environment where adults can learn is just as important. Adults need to feel safe in their environment in order to reach out to the learning process. Imel (1994) states, "Any anxiety adult learners might have about appearing foolish or exposing themselves to failure should be eased, but they should not feel so safe that they do not question their current assumptions or are not challenged on other ways" (p.3). This can be very challenging when teaching courses for the fire service. Speaking up, or challenging a process can bring about razing and ridicule. Barr and Dailey (1996) state, "It is necessary to break down competition and focus on collaboration, to create an atmosphere that honor the spirit of inquiry. People will take the route of safety. They won't experiment if they don't feel safe" (p. 190).

Many adults feel intimidated in the general classroom setting, especially if they are new to the organization. They will sit back and not be actively involved in the learning process. One alternative to the traditional classroom lecture is computer-based training. While discussing the merits of computer-based training over traditional classroom training in an article for Emergency Medical Services, Brian Keaton (1996) states, "It's not threatening. People may feel threatened

by the computer, but I guarantee you, there's nothing more threatening than having to answer questions in front of your peers. Now that's intimidating" (pg. 57). Keaton continues,

> If I asked a physician to come to the front of the room and resuscitate a patient with everybody watching, he wouldn't want to be anywhere near my program; but if I ask you in the privacy of your own cubicle to resuscitate the patient, even though I may later evaluate how you do, it's not as intimidating (p. 57).

While the newer generation of Fire Fighters and Paramedics have grown up with computers, even using them in school, for many adult learners this is still new technology. Page and O'Brien (2001) state, "Many adult learners have been forced onto the internet and have varying comfort levels with this style of course delivery. Yet these adults also have the most to gain" (p. 25). One way for the training division to counter this problem is to provide in-depth training about the program prior to implementing any new technology. This is the standard in the fire service any time a new piece of equipment is introduced to employees. While computer-based training can meet the needs of adult learners, the question remains as to whether it can meet the required continuing medical education needs of the department.

Another term for computer-based training is Computer Assisted Instruction (CAI). These computer tutorials are interactive and present situations to students that require responses. These responses can either be a simple yes or no or may require multiple decisions that lead you other scenarios based on your answers. Sweeters (1994) states, "The tutorial is a classic model of computer based learning design" (p. 47). It requires the student to participate in order to complete the program. According to Long, Nasman, and Zahniser (1983), the ability for the student to follow different paths is very important (p. 21).

Schlei (1996) states,

> As students master one part of a lesson, they proceed to the next, often skipping through materials they are proficient with. In other cases they may need extra spend time in troublesome areas. Self-testing mechanisms provide instant feedback on student progress. Some software prevents the student from proceeding until correct responses have been given. Often tutorials are used to explain the correct information (p. 19).

In order for computerized continuing medical education to be effective, multiple learning styles must be taken in to consideration. In an article for Emergency magazine, Cynthia Pollock describes the design features that computer assisted instruction must include in order for it to be an effective teaching tool. Pollock (1992) points out that that the primary objectives behind the design of software for emergency personnel should include:

- Individualized instruction
- Opportunity for students to learn at their own pace and on their own schedule
- A learning environment that is non-judgmental and non-threatening
- Consistency in the information taught to students
- Immediate feedback
- Improved knowledge retention and skill maintenance
- Active participation in learning (p. 48)

When all of these objectives are met in the design phase of the software, improved outcomes are seen when utilizing computer-assisted instruction over traditional classroom lecture instruction. Robert Porter, a Paramedic in Pittsburg Pennsylvania participated in a comparison study of continuing education methods offered to local Paramedics. Three methods were use to provide

the continuing education- lecture, video, and computer-assisted instruction. The study concluded that the computer assisted instruction group scored higher in both the post-test and 60 days later in a follow up examination. Porter (1991) concluded that, "CAI demonstrated a superiority in knowledge acquisition and retention over lecture and video presentations in the continuing education of paramedics" (p. 384). Porter theorized that the reason student using CAI had better scores was because they moved through the material at their own pace, data screens could be reread if the student needed, and students were forced to answer a particular question correctly before they could proceed through the rest of the program.

Other obstacles for providing training make the effectiveness of computer assisted instruction that much more attractive. These include how to provide cost-effective training, as well as how to make the best use of an employee's time. Somers (2002) states,

> Studies have shown that students who use Computer Based Training (CBT) are able to acquire the same amount of knowledge as their lecture format counterparts, but in far less time. Savings of 25 to 50 percent have been reported with most studies finding 35 to 45 percent reduction in the length of time it takes to complete their training. This allows employees to return to work sooner saving the organization money (p. 21).

Computer assisted instruction (CAI) also tackles the problem of moving emergency response units from areas throughout the city to a centralized location and placing them out of service. Somers (2002) states,

> CBT is also anytime, anywhere learning. This is particularly important to EMT's assigned to operations since their routine is highly unpredictable and subject to constant interruptions by station duties or emergency responses. By utilizing

> CBT, students can access the system whenever they have time rather than keeping to a fixed schedule. For the organization, this format eliminates the need to schedule fire fighters for classes and reschedule personnel who missed classes (p. 21).

An additional benefit of computer-assisted instruction is the cost savings to the organization. Computer assisted instruction eliminates the need for printing and the updating of materials handed out in class. It also eliminates the high cost of providing instructors, which are hired on an overtime basis at Boca Raton Fire Rescue Services. Somers (2002) states, "Off-the shelf" and customizable CBT programs can run as little as $20 to $100 per student" (p. 20). You are also not limited by classroom space, which can mean more training sessions and more instructor costs.

Acceptance of any training program determines whether it will be successful. Moshinskie (1997) states,

> EMS personnel tend to be less motivated to take continuing education than are technical professional. Therefore, EMS educators need to assure that continuing education not only is readily available to EMS personnel, but is acceptable. EMS personnel who find the continuing education actively acceptable would feel better motivated to complete it (p. 258).

Because computers are so engrained in today's society, this type of instruction is more relevant to keeping up with today's fast pace, and demand for up to date information. Rowe (1993) states, "Probably the most important aspect of computerized instruction is that it is typically viewed by the student as fun and therefore will hold the student's attention and interest, and reinforce learning" (p. 54).

In summary, the literature review established that continuing medical education is not only required of Paramedics, but necessary to maintain and learn new skills. Adult learners require their education to be in a format that provides feedback, allows the participant to feel safe, and trains them in a way that allows transfer of knowledge to the workplace. Providing cost effective, time efficient training is a necessity for a profession that is busier than ever. Making sure the method of delivery is accepted will ensure that all parties involved are satisfied with the training.

PROCEDURES

The initial research was performed at the U.S. Fire Administration's Learning Resource Center. The literature review included periodicals, books, trade journals, local and national newspapers, internet journals, and one personal interview. A local city library was utilized to further the research. The author's personal library was also reviewed for corresponding information. A survey was conducted to answer the research questions. The survey is detailed as follows.

Medical Continuing Education Analysis Survey Questionnaire

An attempt was made to survey Boca Raton Fire Rescue Services immediately after completing an on-line Incident Command System course. A questionnaire was developed from scratch to ascertain Boca Raton Fire Rescue Services employees' feelings towards our current training methods, the on-line course they just participated in, and video based training received in the past. The questionnaire was pilot tested on the staff of the Training Division who have knowledge of the three types of training programs. No changes were necessary after the pilot test. A copy of the survey questionnaire is located in the Appendix. In total, 100 surveys were

hand carried between October 1, 2004 and November 1, 2004. Participants were asked to either fill out the survey immediately or return it via fax.

Respondents had until November 15, 2004 to return the surveys. Of the 100 surveys initially sent, 64 were completed and returned by the appropriate deadline. A total of 64% of surveys were received. The goal of the survey was to answer the research questions and inquire about what BRFRS can do to better assist BRFRS employees in completing the required amount of continuing medical education while on duty.

Question #1 asked the participant if they felt the current method of classroom training wass an effective method of providing continuing medical education? Respondents could simply answer yes or no. Survey question #1 was asked to answer research question #1.

Question #2 asked participants if they felt driving to the training center was an efficient use of training hours? Survey question #2 was asked to answer research question #1.

Question #3 asked participants if they felt continuing medical education should be provided while on duty? Respondents could simply answer yes or no. Survey question #3 was asked to answer research question #1.

Question #4 asked participants if they felt units should be placed out of service to receive continuing medical education? Respondents could simply answer yes or no. Survey question #4 was asked to answer research question #1.

Question #5 asked participants if they had ever taken video based training? Respondents could simply answer yes or no. Survey question #5 was asked to answer research questions #2 and #3.

Question #6 asked participants if video based training provided an effective method for learning? Respondents could simply answer yes or no. Survey question #6 was asked to answer research question #2 and #3.

Question #7 asked participants if they completed the recent Blood-borne Pathogens computer based program? Respondents could simply answer yes or no. Survey question #7 was asked to answer research questions #1 and #2.

Question #8 asked participants if the computer based training provided and effective method for learning? Respondents could simply answer yes or no. Survey question #8 was asked to answer research question #3.

Question #9 asked participants if they had sufficient access to a computer to complete the on-line course? Respondents could simply answer yes or no. Survey question #9 was asked to answer research questions #3.

Question #10 asked participants if they felt the computer program operated properly with few technical problems? Respondents could simply answer yes or no. Survey question #10 was asked to answer research question #3.

The final survey question, question #11 asked participants which method for medical continuing education they preferred? Respondents could answer either video or computer. Survey question #11 was asked to answer research question #3.

Assumptions

An assumption was made that all respondents to the questionnaires had an understanding of the questions and were honest with their answers.

Limitations

Several limitations were experienced in researching this applied research project.

The first limitation was the initial response for the medical continuing education questionnaire. Although participants had an option of filling out the survey immediately, returning through inter-city mail, or by fax, only 64% of the surveys were returned. The second limitation was that only one computer based training program was evaluated. This study is limited in the programs that were evaluated recently by Boca Raton Fire Rescue Services and does not attempt to base a decision regarding all computer-based training.

RESULTS

The results of the literature review and the surveys provided the following answers.

1. **Is there a more efficient method of providing Continuing Medical Education than the traditional classroom format?**

   Of the 64 respondents of the survey, 50 (78%) felt that classroom training is the preferred method for continuing medical education. However, 54 (84%) of the respondents agree that driving to the training center is not an efficient use of training time. All 64 (100%) of the respondents felt that the current method of providing this training while on duty is the preferred method. Additionally, 64 (100%) felt that units should continue to be placed out of service to complete the required training. As far as video based training is concerned, only 20 (31%) felt it provided an effective method for learning. In contrast, 41 (64%) of the respondents felt that the computer based blood-borne pathogens class, provided an effective method for learning the required information.

2. **What previous training methods for medical continuing education have been utilized by Boca Raton Fire Rescue Services?**

   Of the 64 responses of the survey, 33 (51%) of the respondents stated they had

utilized video based training in the past. All 64 (100%) of the respondents stated they had recently utilized the computer based Blood-borne Pathogens training.

4. **Will computer based continuing medical education be accepted by Boca Raton Fire Rescue Services personnel?**

41 (64%) of the respondents felt that the computer based blood-borne pathogens class, provided an effective method for learning the required information.

Unfortunately, 49 (72%) felt they did not have sufficient access to a station computer in order to complete the training. On a positive side, 41 (64%) felt the program operated with few technical problems. Not surprisingly, 52 (81%) of the respondents prefer the computer continuing education over the video programs.

DISCUSSION

1. Is there a more efficient method of providing Continuing Medical Education than the traditional classroom format?

The results show that the majority of respondents still prefer the traditional classroom method when receiving medical training. They don't, however, feel it is an efficient utilization of their workday. The results show managers and the training officer that respondents continue to expect training to be provided while they are on duty. Respondents also expect units to be placed out of service so that they don't get interrupted while in training.

2. What previous training methods for medical continuing education have been utilized by Boca Raton Fire Rescue Services? The results indicate that only half of the respondents have participated in the older style of medical training, which utilizes videos to review

various medical topics. A newer method of computer-based training was recently utilized so respondents could renew their required training on blood-borne pathogens. All respondents completed the required training.

3. Will computer-based continuing medical education be accepted by Boca Raton Fire Rescue Services personnel? The results show only a small percentage of respondents felt that video based training is an effective method for medical continuing education. In contrast, a large percentage of respondents felt that the computer-based training was an effective method for receiving the required update. The results do indicate that access to the computer poses a problem. Fortunately the computer program functioned without many technical difficulties. Respondents clearly showed the computer-based training would be an accepted method for providing medical continuing education.

Perhaps the reason traditional lecture format is still the preferred method for instruction is due to the fact that this is how paramedics have always received their training. Traditional lecture format is used in the initial EMT and Paramedic training at the community college level, and has historically been used in required re-certifications like Advanced Cardiac Life Support. One of the main problems with the traditional lecture format is the quality of the instruction from the person performing the lecture. Many times during the four days of training that is required to reach all members of the department, you will see two to three different instructors. Managers should be asking if everyone is receiving the same training. The other key issue against the traditional lecture format is logistics and time management. Eastham (2001) states, “Classroom training competes for time and resources with all of the other activities required in an EMS organization” (p. 42). Assistant Chief Kathy Miller of the Orlando Fire Department concurs. “Managing duty schedules to get people in the

classroom and maintaining the consistency and quality of the presentation time after time are serious concerns" (Eastham, 2001, p. 42). In a study on the effectiveness of computer-managed instruction versus traditional classroom lecture, Susan Schmidt et. al. agree that educators can use alternatives to the traditional lecture format while still offering quality education. Schmidt (1991) states,

> Advantages of an effective Computer Managed Instruction (CMI) as an alternative to traditional classroom lecture (TCL) include flexible course scheduling, increased autonomy for the student in the implementation of the course, early identification of learner need through an integrated bookkeeping system, and freedom for faculty from teaching repetitive course material for in-depth tutoring time (p. 159).

"Computer based training developed as a result of the limitations of traditional teaching approaches" (Knebel, 2000).

Alternative training methods for the fire service have been around for years. In the early 1990's the Fire & Emergency Training Network (FETN) began running twice weekly broadcasts on various subjects related to the fire service. They provide a half-hour EMS segment called "E-Med" which covers subjects such as smoke inhalation, intraossceous infusion, and crush syndrome (Benson, 1992, p. 37). FETN feels one of its strengths is its ability to cover more senses which help individuals retain information during training. Dennis Murphy, Division Chief of the Springfield Oregon Department of Fire and Life Safety states, "with the spoken word, maybe 10 percent is retained. But with Visual media, we have the experience of going right along with a haz mat situation or a big fire" (Benson, 1992, p. 38). Cost is another factor that FETN is using to sell its programming. When you hold traditional classroom training you

have the cost of the facility, handouts, and most expensively the instructors. FETN charges a one-time installation fee and a monthly subscriber fee. Chief John Turner concurs with FETN's sales pitch. Turner states, "We get a whole slew of training for a month for the cost of one videotape" (Benson, 1992, p. 38). Ken Hines, director of FETN's training and education sells the satellite program by comparing it with the cost of sending twenty Paramedics to a seminar. "It's like attending a national seminar without all of the expenses" (Benson, 1992, p.38).

One of FETN's main drawbacks is the lack of EMS training included in the broadcasts. Of the nearly four hours of training received each month only 30 minutes is dedicated to EMS issues. This could be due in part to its ownership of "American Heat" and "Pulse". These programs compete with FETN's sales to fire departments across the country.

Another drawback to video or satellite broadcasting is the lack of interaction the student has while attending class. Students could attend the program without even listening to or being concerned with the content. Without feedback there is no way of knowing for sure if the student comprehended or learned the material presented. Ricky Davidson, chairman of the EMS section of the International Association of Fire Chief's states,

> It's not an answer to solving all the training problems across the country. It doesn't address local requirements, practical drills or variant methods, but it does have the potential of being very useful in keeping emergency services abreast of the latest techniques and events. (Benson, 1992, p.38).

No training method, no matter how much money it saves, how much time it saves, or how effective it is will be effective if personnel do not accept it. The method in which a new form of training is introduced should be thoroughly thought through by managers in order for it to be accepted. When the Phoenix Fire Department initially implemented computer-based

training they were met with some resistance. In order to keep all members of the department happy in regards to their continuing education, managers chose to offer the training in both traditional lecture format and computer-based training. Only forty individuals chose to attend the traditional classroom format. The reason those forty individuals chose not to participate in the computer-based training could be based on several issues. According to Brown (2001),

> Age may be a particular relevant influence on learner choices and outcomes in computer-based training environments. In general, research has found that older employees have more negative attitudes towards computer-based training than younger employees and have less interest in this type of training thus, increased age may be associated with greater resistance to the idea of a computer replacing the training: this resistance may manifest itself in the form of less practice and time on task (p.279).

Managers need to provide training on any new format to ensure personnel are comfortable with the implementation. Porter states,

> The computer can be a very intimidating machine, especially to someone who has not used it before. Many people see the device as a magic 'Black box' with a great, mystical power. Programs which are flawed in content, in programming design, or in educational application will not only serve poorly as an educational tool, but may additionally deter the learner from future computer experience (p. 38).

Not only is a user's comfort with the equipment important, but the quality of the programs offered will also affect the acceptance of a new way of providing training. Computerized training packets have been around for years in the fire service. Course offered

have included the International Fire Service Training Association's (IFSTA) Essentials of Fire Fighting, Hazardous Materials training, and the Incident Command System. Many of the older programs were not very interactive and did not hold the students attention. Today's software programs are more interactive and have video, sounds and even games associated with the topic. Schlei (1996) states,

> As people become more adept at using CAI, they will become more discriminating regarding the quality of the programs. In other words, it will take more to dazzle them. This probably relates more to the entertainment value than the educational value, but self-paced instruction such as CAI needs to hold the users interest in order to work (p. 19).

According to Ference and Vockell (1994) this is because adults are active learners. They prefer active learning situations over passive ones (p. 25). This is why computer assisted instruction is preferred over sitting in a classroom passively listening to an instructor.

Porter states,

> Providing feedback is a critical step in the training process. The learners need to know whether the learning objectives have been met. For adult learners, this phase of the instruction is especially important. Recall that adult learners are usually problem-centered, task oriented individuals, seeking the acquisition of a new skill to solve a real-life problem (p.29).

In summary, the current daily requirements of shift personnel make it especially difficult to maintain up to date medical skills and attend mandated continuing medical education. New training methods need to be implemented in order to meet the requirements set forth by the State of Florida necessary to maintain licensure. While the traditional classroom lecture is the

preferred method of instruction, personnel have experienced alternatives forms of continuing medical education with varying levels of success. A large percentage of respondents felt the computer-based training they recently received was an effective method for receiving the required update. The fact that they accept the new method of instruction will help administrators implement this type of training with little resistance. Boca Raton Fire Rescue Services prides itself on its quality of Paramedic care and this can only be reinforced with effective quality training.

RECOMMENDATIONS

Based on the results, the author offers these recommendations on providing medical continuing education to Boca Raton Fire Rescue Services personnel.

1. **Continue to offer training to fire fighters while on duty.** Currently Boca Raton Fire Rescue Services provides all training while personnel are on duty. Offering training to fire fighters while they are on duty shows personnel the commitment by managers. When implementing changes, it is more likely they will be accepted if they are introduced a few at a time. In the future some of the classes could be taken while off duty or if computer based training is implemented, many personnel may choose to complete it from home so as not to be interrupted.
2. **Units should be placed out of service so that training is not interrupted multiple times.** Currently only two of the eight stations have more than one computer. In order for this to be feasible in relation to effective use of time, a minimum of three computers will need to be installed at each fire station. This will limit the amount of time units are placed out of service.

3. **Offer training at the stations so as not to require units to drive to the training center.** This will eliminate the waste of time units now spend driving to a main training classroom. If units choose to stay in service while completing their training, they can pick the time best suited for their daily routine.
4. **Continue to utilize the computer based training program for renewal of the blood-borne pathogens update.** Once a program is found to be effective and accepted, it is wise to continue with its use. Participants would also be familiar with the format which will save time.
5. **Find additional course offered through computer based training for medical continuing education requirements.** Additional computer based courses should be tested for their effectiveness and acceptance. This will free up other training days for fire and hazardous materials training.
6. **Re-evaluate the computer courses being offered and the acceptance by BRFRS personnel.** By re-evaluating training be offered, managers can make changes where needed.

By following the above steps, BRFRS can continue to offer quality continuing medical education, while at the same time, free up valuable classroom time for fire and hazardous materials training.

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APPENDIX

Medical Continuing Education Analysis Survey Questionnaire

1) Do you feel the current method of training (classroom training at Station #5) is an effective method for providing medical continuing education?
   Yes _____
   No _____

2) Do you feel driving to the training center is an efficient use of training hours?
   Yes _____
   No _____

3) Do you feel medical continuing education should be provided while on duty?
   Yes _____
   No _____

4) Do you feel units should be placed out of service to receive medical continuing education?
   Yes _____
   No _____

5) Have you ever learned from video based training (example: American Heat, *Open College* video based programs)?
   Yes _____
   No _____

6) Did the format provide an effective method for learning?
   Yes _____
   No _____

7) Did you complete the recent Incident Command System computer based program?
   Yes _____
   No _____

8) Did the format provide an effective method for learning?
   Yes _____
   No _____

9) Did you feel you had sufficient access to a station computer in order to complete the modules?
   Yes _____
   No _____

10) Did you feel the program operated properly with few technical problems?
    Yes _____
    No _____
    _____

11) Which method for medical continuing education would you prefer, video or computer?
    Video _____ Computer _____